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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/925,679	08/10/2001	Minoru Toriumi	025311-0107	3716

22428 7590 03/07/2003

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EXAMINER

CHU, JOHN S Y

ART UNIT

PAPER NUMBER

1752

DATE MAILED: 03/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

AS-4

Office Action Summary

Application No.

09/925,679

Applicant(s)

TORIUMI ET AL.

Examiner

John S. Chu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 August 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>3</u> | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

This Office action is in response to the application filed August 10, 2001.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 1,4, and 10-15 rejected under 35 U.S.C. 102(b) as being clearly anticipated by Jp-05127370 (KOKUBO et al), VARANASI et al or JP-265177 (IWASA et al).

The claimed invention is drawn to a resist composition comprising at least one type of a first compound having two or more intramolecular adamantyl structures;

a base resin; and a second compound which generates an acid by active beam irradiation.

KOKUBO et al anticipates the claimed invention at Examples 5,11 and 12 wherein a compound having formula (a-6) is disclosed having at least two adamantyl groups as recited in claim 1.

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VARANASI et al anticipates the claimed invention at Exmaple 3 wherein a compound having two adamantyl groups is disclosed, specifically 2,5,bis(adamanatane-1-carboxyloxy-2,5 dimethylhexane.

IWASA et al anticipates the claimed invention by disclosing a compound (D) on page 6 of the Japanese published application.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over VARANASI et al, NOZAKI et al or SEO et al.

The claimed invention has been recited above and further includes a method for manufacturing a semiconductor device comprising an application step of forming a resist film by means of applying the resist composition according to claim 1 onto a substrate;

a pre-exposure heating step of heating the resist film formed in said application step;

an exposure step of exposing the resist film by means of irradiating the resist film with an active beam via a given mask after said pre-exposure heating step, the active beam having a wavelength of 150 to 250 nm;

a post-exposure heating step of heating the resist film after said exposure step;

a development step of forming a resist pattern by means of developing the resist; and

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an etching step of conducting dry etching with the resist pattern as a mask.

VARANASI et al discloses a photoresist composition comprising a cyclic olefin polymer and hydrophobic non-steroidal multi-alicyclic additive. The photoresist composition in Example 3 is processed by coating, pre-exposure baking, exposure, post-exposure baking and development.

The method lacks an explicit disclosure for an etching step, however column 3, lines 20-23 recite that the compositions of VARANASI et al are capable of providing high resolution, with good developability, and pattern transfer characteristics. The pattern transfer methods are typically done by some form of wet etching or ion/plasma etching wherein VARANASI et al desires a photoresist composition the ability to withstand etching processes.

It would have been *prima facie* obvious to one of ordinary skill in the art of photoresist processing to add the disclosed etching step in the method of Example 3 of VARANASI et al as disclosed in VARANASI et al for processing the photoresist in the desired manner for forming semiconductor devices and reasonably expect same or similar results as disclosed in VARANASI et al for excellent imageability, developability and etch resistance.

NOZAKI et al discloses a photoresist composition comprising as additives unpolymerized compounds found in column 31, line 36 – column 33, line 5, wherein these compounds disclose structures which anticipate the claimed second compound of claim 1, see compound (XLVI).

NOZAKI et al lacks presence of the unpolymerized compound used in an explicit example in a photoresist composition.

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It would have been *prima facie* obvious to one of ordinary skill in the art of photoresist composition to use any of the listed compounds in column 31, line 36 – column 33, line 5 with as a dissolution inhibitor with a base resin and an acid generator in the photoresist composition with the reasonable expectation of same or similar results as recited in NOZAKI et al for a photoresist suitable for excimer laser lithography, highly sensitive resist composition and having excellent dry etch resistance without swelling.

5. Claims 1, 4, 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over SEO et al.

The claimed invention has been recited above and is included by reference.

SEO et al discloses a photoresist composition having a cyclohexane carboxylic acid derivative as an acid decomposable compound.

SEO et al lacks the use of adamantane containing acid cleavable compounds as recited in column 5, line 41 – column 6, line 39 (Examples 6 and 7) in an explicit example, however SEO et al clearly teaches the alternative use of any of the carboxylic acid derivatives in Examples 1-13.

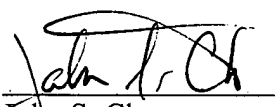
It would have been *prima facie* obvious to one of ordinary skill in the art of photoresist compositions to use the carboxylic acid compounds of Example 6 or 7 in a photoresist composition as the acid cleavable compound with the reasonable expectation of same or similar results for easier decomposition by an acid and improved etching resistance due to the presence of the alicyclic groups.

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6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Chu whose telephone number is (703) 308-2298. The examiner can normally be reached on Monday - Friday from 9:30 am to 6:00 pm.

The fax phone number for this Group is (703) 305-7718.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.


John S. Chu
Primary Examiner, Group 1700

J.Chu
March 4, 2003